

SLR2000 Status: April 2004

- Star Calibrations - working.

Star calibrations provide absolute pointing corrections for satellite tracking. Current model is 22 term trigonometric model which is function of pointing angles.

- Star calibrations are now routinely taken with Automated Operational Software.
- Mount model contains 22 terms - term required for low elevations has been added.
- Stability of mount model appears good. The RMS of the starcal mount model < 3 arcsec.
- Increased ability to image stars to 5th magnitude with software integration of CCD
- provides good star coverage for modeling.

- Ground Calibrations - working.

Ground calibrations provide a measure of the system delay which is needed to correct the roundtrip time of flight of satellites. Ground ranging also provides a simpler environment to test ranging.

- Event Timer and Range Gate Generator checked out with operational software:
- Vernier data for Event Timer still needs correct calibration - currently causing system RMS to be too high.
- Ranging data collected from the ground target with backup laser.
- Signal processing working with ground targets.
- Automated search and acquire working correctly with ground targets.
- Initial system delay calculated and used in satellite processing.

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- Satellite Tracking - some early successes.

Satellite tracking in SLR2000 is more complicated than in traditional SLR systems due to the high laser repetition rate, low return signal strength, narrow laser divergence and narrow field of view.

- Several TOPEX, one AJISAI and one STARLETTE pass have been tracked. Two passes were collocated with MOBLAS-7. Most passes were at night, but the AJISAI pass was taken around noon. SLR2000 data, with a 0.5 millisecond timebias applied, follows MOBLAS-7 data well.
 - Mount is currently being pointed ahead of satellite (point-ahead). Returns come in from where the satellite was (point-behind). The difference between point-ahead and point-behind is greatest near maximum elevation.
 - Low transmit energy (~65 microJoules) of backup laser requires narrowest laser divergence for tracking LEO satellites. LAGEOS and above are not possible until laser is upgraded.
 - RMS of satellite data is high due to Event Timer vernier calibration problem.
- Satellite returns have been sparse. Analysis of receiver optics indicates significant loss of signal at the bandpass filter and field of view stop.

- Near Term Plans:

- Resolve and correct receiver bandpass and field stop issues.
 - Calibrate Event Timer vernier data.
 - Upgrade laser (possibly in-house amplifier addition).
 - Change software to point the telescope behind and add in point-ahead using the Risley Prisms.
 - Add closed-loop tracking by using the quadrant detector information (must first calibrate quadrants).
 - Test normal point generation with SLR2000 data and determine if current generation is adequate.
- Release RFP for SLR replacement contract in early 2005.